

## E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous)

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Chennai Accredited by NAAC with 'A' Grade | Accredited by NBA

NAGAPATTINAM – 611002



### M.E. COMPUTER SCIENCE AND ENGINEERING

#### REGULATION -2021

#### First Year – First Semester

Course Category	COURSE CODE	Course Name	L	T	P	C	Maximum Marks		
							CA	ES	Total
<b>Theory Course</b>									
FC	2101CP101	Advanced Mathematics for Scientific Computing	3	2	0	4	40	60	100
PCC	2102CP102	Advanced Data Structures and Algorithms	3	0	0	3	40	60	100
PEC	2103CP002	Program Elective – I (Networking Technologies)	3	0	0	3	40	60	100
PEC	2103CP007	Program Elective – II (Advanced Computer Architecture)	3	0	0	3	40	60	100
RMC	2101RMX01	Research Methodology and IPR	3	0	0	3	40	60	100
AC		Audit Course – I	2	0	0	0	100	00	100
<b>Laboratory Course</b>									
PCC	2102CP103	Advanced Data Structures and Algorithms Laboratory	0	0	4	2	50	50	100
PCC	2102CP104	Networking Technologies Laboratory	0	0	4	2	50	50	100
<b>Total</b>			<b>17</b>	<b>2</b>	<b>8</b>	<b>20</b>	<b>400</b>	<b>400</b>	<b>800</b>

2101CP101	ADVANCED MATHEMATICS FOR SCIENTIFIC COMPUTING	L	T	P	C
		3	2	0	4
<b>COURSE OBJECTIVE</b>	<ul style="list-style-type: none"> <li>To apply mathematical linear programming techniques to solve constrained problems.</li> <li>To appreciate the use of simulation techniques.</li> <li>To enable them to estimate the value of the parameters involved in the specific distribution from a possible continuum of alternatives.</li> <li>To give an idea of testing the statistical hypothesis claimed based on a set of data points using standard sampling distributions.</li> <li>To impart knowledge of handling random vectors which represent random variables in multi-dimensional space.</li> </ul>				
<b>MODULE 1</b>	<b>LINEAR PROGRAMMING</b>	<b>9 HOURS</b>			
Formulation – Graphical solution – Simplex method – Two phase method –Transportation and Assignment Problems.					
<b>MODULE 2</b>	<b>SIMULATION</b>	<b>9 HOURS</b>			
Discrete Event Simulation – Monte – Carlo Simulation – Stochastic Simulation – Applications to real time problems.					
<b>MODULE 3</b>	<b>ESTIMATION THEORY</b>	<b>9 HOURS</b>			
Estimators: Biasedness, Consistency, Efficiency and Sufficiency – Maximum Likelihood Estimation – Method of moments.					
<b>MODULE 4</b>	<b>TESTING OF HYPOTHESIS</b>	<b>9 HOURS</b>			
Sampling distributions – Estimation of parameters – Statistical hypothesis – Tests based on Normal, t, Chi-square and F distributions for mean, variance and proportion, Tests for independence of attributes and goodness of fit.					
<b>MODULE 5</b>	<b>MULTIVARIATE ANALYSIS</b>	<b>9 HOURS</b>			
Random vectors and Matrices – Mean vectors and Covariance matrices – Multivariate Normal density and its properties – Principal components: Population principal components – Principal components from standardized variables.					
<b>OUTCOME</b>	<ol style="list-style-type: none"> <li>Formulate and find optimal solution in the real life optimizing/allocation/assignment problems involving conditions and resource constraints.</li> <li>Simulate appropriate application/distribution problems.</li> <li>Obtain the value of the point estimators using the method of moments and method of maximum likelihood.</li> <li>Apply the concept of various test statistics used in hypothesis testing for mean and variances of large and small samples.</li> <li>Get exposure to the principal component analysis of random vectors and matrices.</li> </ol>				
<b>REFERENCES</b>	<ol style="list-style-type: none"> <li>Jay L. Devore, “Probability and Statistics for Engineering and the Sciences”, Cengage Learning, 9<sup>th</sup> Edition, Boston, 2016.</li> <li>Johnson, R.A, Irwin Miller and John Freund., “Miller and Freund’s Probability and Statistics for Engineers”, Pearson Education, 9<sup>th</sup> Edition, New York, 2016.</li> <li>Johnson, R.A., and Wichern, D.W., “Applied Multivariate Statistical Analysis”, Pearson Education, Sixth Edition, New Delhi, 2013.</li> <li>Ross. S.M., “Probability Models for Computer Science”, Academic Press, San Diego, 2002.</li> <li>Taha H.A.,, “Operations Research: An Introduction”, Prentice Hall of India Pvt. Ltd. 10 Edition, New Delhi, 2017.</li> <li>Winston, W.L., “Operations Research”, Thomson – Brooks/Cole, Fourth Edition, Belmont, 2003.</li> </ol>				

2102CP102	ADVANCED DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3
<b>COURSE OBJECTIVE</b>	<ul style="list-style-type: none"> <li>To understand the techniques for analyzing the complexity of algorithms</li> <li>To learn the concepts of advanced data structures</li> <li>To design algorithms for solving problems using appropriate data structures</li> </ul>				
<b>MODULE 1</b>	<b>DATA STRUCTURES AND ALGORITHM ANALYSIS</b>	<b>9 HOURS</b>			
Fundamental Data Structures- Analysis Framework-Asymptotic notations - Conditional asymptotic notation- Mathematical Analysis of Recursive - Recurrence tree method for solving recurrences –Master theorem for solving recurrences- Mathematical Analysis of and Non recursive Algorithms - P, NP and NP completeness					
<b>MODULE 2</b>	<b>HEAP STRUCTURE AND AMORTIZED ANALYSIS</b>	<b>9 HOURS</b>			
Binary Heap : Basic heap operations-Min / Max heaps - d-heaps - Leftist heaps and property - Leftist heap Operations -Binomial queues-Binomial queue structure and operations -implementation of binomial queues- Skew heaps - Fibonacci heaps -Cutting nodes in leftist heaps-Lazy merging for binomial queues- Fibonacci heap operations.					
<b>MODULE 3</b>	<b>SEARCH STRUCTURE</b>	<b>9 HOURS</b>			
Binary search trees- AVL trees - Single rotation-Double rotation- Splay trees- Top- down splay trees- Btrees - Red-Black trees- Bottom-up insertion-Top-down red- black trees - Top-down deletion- 2-3 trees - Insertion and deletion-2-3-4 trees - Insertion and deletion- Hashing-Hash function - Separate chaining - Hash tables without linked lists –Rehashing					
<b>MODULE 4</b>	<b>GREEDY AND DIVIDE AND CONQUER</b>	<b>9 HOURS</b>			
Greedy method-Knapsack problem-Tree-vertex splitting-Job sequencing with deadlines - Minimum-cost spanning trees- Prim's algorithm-Kruskal's algorithm- Optimal storage on tapes - Divide-and-conquer- Merge sort- Quicksort -Strassen's matrix multiplication-Convex hull.					
<b>MODULE 5</b>	<b>DYNAMIC PROGRAMMING AND BACKTRACKING</b>	<b>9 HOURS</b>			
Dynamic programming- Multistage graphs - All pairs shortest paths- Single-source shortest paths- 0/1 knapsack -Flow shop scheduling -Backtracking - 8-queens problem - Sum of subsets- Graph coloring- Hamiltonian cycles - Knapsack problem.					
<b>OUTCOME</b>	<ol style="list-style-type: none"> <li>Analyze the complexity of algorithms using Asymptotic notations</li> <li>Design algorithms to perform operations in heap structures and analyze the algorithms for complexity.</li> <li>Analyze the complexity of search tree structures and its algorithms</li> <li>Design algorithms to solve problems using the greedy and divide and conquer Techniques</li> <li>Design algorithms for problem solving using dynamic programming and backtracking methods and analyze it.</li> </ol>				
<b>REFERENCES</b>	<ol style="list-style-type: none"> <li>Mark Allen Weiss, Data Structures and Algorithms in C++, Fourth Edition, Pearson, 2014.</li> <li>E. Horowitz, S. Sahni and S. Rajasekaran, Computer Algorithms / C++, University Press, 2008</li> <li>Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Introduction to</li> <li>Algorithms, Third Edition, Prentice Hall of India, New Delhi, 2012</li> <li>Adam Drozdek, Data Structures and Algorithms in C++, Fourth Edition, 2013</li> <li>Anany Levitin, Introduction to The Design and Analysis of Algorithms, Third Edition, Pearson, 2014.</li> </ol>				

2101RMX01	RESEARCH METHODOLOGY AND IPR	L	T	P	C
		3	0	0	3
<b>COURSE OBJECTIVE</b>	<ul style="list-style-type: none"> <li>• Problem formulation, analysis and solutions.</li> <li>• Technical paper writing / presentation without violating professional ethics</li> <li>• Patent drafting and filing patents.</li> </ul>				
<b>MODULE 1</b>	<b>RESEARCH PROBLEM FORMULATION</b>	<b>9 HOURS</b>			
Meaning of research problem- Sources of research problem, criteria characteristics of a good research problem, errors in selecting a research problem, scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, necessary instrumentations					
<b>MODULE 2</b>	<b>LITERATURE REVIEW</b>	<b>9 HOURS</b>			
Effective literature studies approaches, analysis, plagiarism, and research ethics.					
<b>MODULE 3</b>	<b>TECHNICAL WRITING / PRESENTATION</b>	<b>9 HOURS</b>			
Effective technical writing, how to write report, paper, developing a research proposal, format of research proposal, a presentation and assessment by a review committee.					
<b>MODULE 4</b>	<b>INTRODUCTION TO INTELLECTUAL PROPERTY RIGHTS (IPR)</b>	<b>9 HOURS</b>			
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.					
<b>MODULE 5</b>	<b>INTELLECTUAL PROPERTY RIGHTS (IPR)</b>	<b>9 HOURS</b>			
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System, IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.					
<b>OUTCOME</b>	CO1 : To formulate research problem CO2 : To carry out research analysis CO3 : To follow research ethics CO4: To understand that today's world is controlled by computer, information technology, but tomorrow world will be ruled by ideas, concept, and creativity CO5 : To understand about IPR and filing patents in R & D.				
<b>REFERENCES</b>	1. Asimov, "Introduction to Design", Prentice Hall, 1962. 2. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007. 3. Mayall, "Industrial Design", McGraw Hill, 1992. 4. Niebel, "Product Design", McGraw Hill, 1974. 5. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners" 2010				

**PROGRAM ELECTIVE – I**

2103CP002	NETWORKING TECHNOLOGIES	L	T	P	C
		3	0	0	3
<b>COURSE OBJECTIVE</b>	To learn about integrated and differentiated services architectures. <ul style="list-style-type: none"> <li>• To understand the working of wireless network protocols.</li> <li>• To study the developments in cellular networks.</li> <li>• To get familiarized with next generation networks.</li> <li>• To know the concepts behind software defined networks.</li> </ul>				
<b>MODULE 1</b>	<b>NETWORK ARCHITECTURE AND QoS</b>	<b>9 HOURS</b>			
Overview of TCP/IP Network Architecture – Integrated Services Architecture – Approach – Components – Services – Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.					
<b>MODULE 2</b>	<b>WIRELESS NETWORKS</b>	<b>9 HOURS</b>			
IEEE 802.16 and WiMAX – Security – Advanced 802.16 Functionalities – Mobile WiMAX – 802.16e – Network Infrastructure – WLAN – Configuration – Management Operation – Security – IEEE 802.11e and WMM – QoS – Comparison of WLAN and UMTS – Bluetooth – LiFi – Protocol Stack – Security – Profiles					
<b>MODULE 3</b>	<b>CELLULAR NETWORKS</b>	<b>9 HOURS</b>			
GSM – Mobility Management and call control – GPRS – Network Elements – Radio Resource Management – Mobility Management and Session Management – Small Screen Web Browsing over GPRS and EDGE – MMS over GPRS – UMTS – Channel Structure on the Air Interface – UTRAN – Core and Radio Network Mobility Management – UMTS Security					
<b>MODULE 4</b>	<b>4G NETWORKS</b>	<b>9 HOURS</b>			
LTE – Network Architecture and Interfaces – FDD Air Interface and Radio Networks – Scheduling – Mobility Management and Power Optimization – LTE Security Architecture – Interconnection with UMTS and GSM – LTE Advanced (3GPP Release 10) – 4G Networks and Composite Radio Environment – Protocol Boosters – Hybrid 4G Wireless Networks Protocols – Green Wireless Networks – Physical Layer and Multiple Access – Channel Modelling for 4G – Introduction to 5G & XG networks.					
<b>MODULE 5</b>	<b>SOFTWARE DEFINED NETWORKS</b>	<b>9 HOURS</b>			
Introduction – Centralized and Distributed Control and Data Planes – Open Flow – SDN Controllers – General Concepts – VLANs – NVGRE – Open Flow – Network Overlays – Types – Virtualization – Data Plane – I/O – Design of SDN Framework					
<b>OUTCOME</b>	<ul style="list-style-type: none"> <li>• Identify the different features of integrated and differentiated services.</li> <li>• Demonstrate various protocols of wireless networks.</li> <li>• Analyze the use of next generation networks.</li> <li>• Provide solutions using SDN.</li> <li>• Design protocols for cellular networks.</li> </ul>				
<b>REFERENCES</b>	<ol style="list-style-type: none"> <li>1. William Stallings, “High Speed Networks and Internets: Performance and Quality of Service”, Prentice Hall, Second Edition, 2002.</li> <li>2. Martin Sauter, “From GSM to LTE, An Introduction to Mobile Networks and Mobile Broadband”, Wiley, 2014.</li> <li>3. Savo G Glisic, “Advanced Wireless Networks – 4G Technologies”, John Wiley &amp; Sons, 2007.</li> <li>4. Jonathan Rodriguez, “Fundamentals of 5G Mobile Networks”, Wiley, 2015.</li> <li>5. Martin Sauter, “Beyond 3G – Bringing Networks, Terminals and the Web Together: LTE, WiMAX, IMS, 4G Devices and the Mobile Web 2.0”, Wiley, 2009.</li> <li>7. Naveen Chilamkurti, Sherali Zeadally, Hakima Chaouchi, “Next-Generation Wireless Technologies”, Springer, 2013.</li> <li>8. Erik Dahlman, Stefan Parkvall, Johan Skold, “4G: LTE/LTE-Advanced for Mobile Broadband”, Academic Press, 2013.</li> </ol>				

**PROGRAM ELECTIVE – II**

2103CP007	ADVANCED COMPUTER ARCHITECTURE	L	T	P	C
		3	0	0	3
<b>COURSE OBJECTIVE</b>	<ul style="list-style-type: none"> <li>To introduce the fundamental techniques based on parallel processing.</li> <li>To develop the foundations for analyzing the benefits of design options in computer architecture.</li> <li>To gain knowledge about the application of the various computing techniques.</li> </ul>				
<b>MODULE 1</b>	<b>PIPELINING AND ILP</b>	<b>9 HOURS</b>			
Fundamentals of computer design-Basic and intermediate concepts of pipelining- Measuring and reporting performance -Instruction level parallelism and its exploitation - Concepts and challenges -Basic compiler techniques for ILP-Reducing branch costs with prediction-Overcoming data hazards with dynamic scheduling - Dynamic branch prediction.					
<b>MODULE 2</b>	<b>ADVANCED TECHNIQUES FOR EXPLOITING ILP</b>	<b>9 HOURS</b>			
Speculation-Multiple issue processors-Compiler techniques for exposing ILP -Limitations on ILP for realizable processors - Hardware versus software speculation-Multithreading: Using ILP support to exploit thread-level parallelism -Performance of advanced multiple issue processors-Efficiency in advanced multiple issue processors					
<b>MODULE 3</b>	<b>MULTIPROCESSORS</b>	<b>9 HOURS</b>			
A taxonomy of parallel architectures- Models for communication and memory architecture - Symmetric and distributed shared memory architectures - Cache coherence issues - Performance issues - Synchronization issues - Models of memory consistency - Interconnection networks - Buses, crossbar- Multi-stage switches.					
<b>MODULE 4</b>	<b>MEMORY HIERARCHY</b>	<b>9 HOURS</b>			
Introduction - Eleven advanced Optimizations of cache performance - Memory technology and optimizations - SRAM technology-DRAM technology-Protection: Virtual memory and virtual machines- Protection via virtual memory-Protection via virtual machine-Virtual machine monitor-Design of memory hierarchies					
<b>MODULE 5</b>	<b>STORAGE SYSTEMS</b>	<b>9 HOURS</b>			
Advanced topics in disk storage -Disk power-Advanced topics in disk arrays-Definition and examples of real faults and failures- I/O performance, reliability measures and benchmarks-Throughput versus response time-Transaction processing benchmarks-A eLittle queuing theory.					
<b>OUTCOME</b>	<ul style="list-style-type: none"> <li>Analyze the working principle of ILP.</li> <li>Design the advanced techniques for exploiting ILP.</li> <li>Compare the different multiprocessor architectures.</li> <li>Design the cache optimizations and virtual memory.</li> <li>Analyze the different storage systems and its performance measures.</li> </ul>				
<b>REFERENCES</b>	<ol style="list-style-type: none"> <li>John L. Hennessey and David A. Patterson, Computer Architecture - A quantitative approach. Noida: Morgan Kaufmann / Elsevier, 2019.</li> <li>William Stallings, Computer Organization and Architecture - Designing for Performance. NewDelhi: Pearson Education, 2009 seventh edition.</li> <li>John L. Hennessey and David A. Patterson, Computer Organization and Design: The Hardware/Software Interface, Third Edition, 2004.</li> <li>David E. Culler and Jaswinder Pal Singh, Parallel Computing Architecture: A hardware/software approach. Noida: Morgan Kaufmann / Elsevier, 1999.</li> </ol>				

2102CP103	ADVANCED DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	4	2
<b>COURSE OBJECTIVE</b>	<ul style="list-style-type: none"> <li>To implement the different data structures in C++</li> <li>To introduce mathematical aspects and implement solutions for specific problem</li> <li>To implement the different algorithmic design techniques</li> </ul>				
<b>EXPERIMENT 1</b>	Design and Implement the concepts of linear and non-linear data structures for solving Problems				
<b>EXPERIMENT 2</b>	Create Min Heap and perform the operations on it				
<b>EXPERIMENT 3</b>	Implement operations on Leftist Heap				
<b>EXPERIMENT 4</b>	Implement merging of two Skew Heaps				
<b>EXPERIMENT 5</b>	Perform rotations on AVL Tree				
<b>EXPERIMENT 6</b>	Implement sorting techniques				
<b>EXPERIMENT 7</b>	Create convex hull using divide and conquer				
<b>EXPERIMENT 8</b>	Job sequencing with deadlines using greedy method				
<b>EXPERIMENT 9</b>	0/1 Knapsack using dynamic programming				
<b>EXPERIMENT 10</b>	Graph coloring using backtracking				
<b>OUTCOME</b>	Design and Implement the concepts of linear and non-linear data structures for solving Problems				

2102CP104	NETWORKING TECHNOLOGIES LABORATORY	L	T	P	C
		0	0	4	2
<b>COURSE OBJECTIVE</b>	<ul style="list-style-type: none"> <li>• Demonstrate the operation of wireless networks.</li> <li>• Simulate and analyze the performance of GSM, CDMA, LTE and SDN.</li> <li>• To gain knowledge and work on various protocol layers.</li> <li>• To explore network simulators.</li> <li>• Identify the different features of integrated and differentiated services.</li> </ul>				
<b>EXPERIMENT 1</b>	Configure networks using: a) Distance Vector Routing protocol b) Link State Vector Routing protocol				
<b>EXPERIMENT 2</b>	Implement the congestion control using Leaky bucket algorithm.				
<b>EXPERIMENT 3</b>	Installation of NS3 and execution of TCL commands / scripts.				
<b>EXPERIMENT 4</b>	Implementation Point to Point network using duplex links between the nodes. Analyze the packet transfer by varying the queue size and bandwidth. (using simulator)				
<b>EXPERIMENT 5</b>	Implement the dynamic routing protocol by varying the CBR traffic for each node and use a flow monitor ( ) to monitor losses at nodes. (using simulator)				
<b>EXPERIMENT 6</b>	Create a wireless mobile ad-hoc network environment and implement the OLSR routing protocol. (using simulator)				
<b>EXPERIMENT 7</b>	Implement CDMA by assigning orthogonal code sequence for 5 stations, generate the CDMA code sequence and communicate between the stations using the generated code.				
<b>EXPERIMENT 8</b>	Create a GSM environment and implement inter and intra handover mechanisms. (using simulator)				
<b>EXPERIMENT 9</b>	In LTE environment implement Round Robin and Token Bank Fair Queue scheduler in MAC layer.				
<b>EXPERIMENT 10</b>	Write python script to create topology in Mini net and configure Open Flow switches with POX controller to communicate between nodes.				
<b>OUTCOME</b>	<p><b>Upon completion of the course, the student will be able to</b></p> <ul style="list-style-type: none"> <li>• Judge the emerging wireless technology standards. Configure functionalities of router and switches.</li> <li>• Assess the importance of wireless ad-hoc networks. Compare and contrast various wireless technologies.</li> <li>• Explain and design the considerations for deploying wireless network infrastructure.</li> </ul>				



**AUDIT COURSE – I**

2101AU001	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C	
		2	0	0	0	
<b>COURSE OBJECTIVES:</b>						
	1. Teach how to improve writing skills and level of readability					
	2. Tell about what to write in each section					
	3. Summarize the skills needed when writing a Title					
	4. Infer the skills needed when writing the Conclusion					
	5. Ensure the quality of paper at very first-time submission					
<b>MODULE I</b>	<b>INTRODUCTION TO RESEARCH PAPER WRITING</b>	<b>6 Hours</b>				
Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness						
<b>MODULE II</b>	<b>PRESENTATION SKILLS</b>	<b>6 Hours</b>				
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction						
<b>MODULE III</b>	<b>TITLE WRITING SKILLS</b>	<b>6 Hours</b>				
Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check						
<b>MODULE IV</b>	<b>RESULT WRITING SKILLS</b>	<b>6 Hours</b>				
Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions						
<b>MODULE V</b>	<b>VERIFICATION SKILLS</b>	<b>6 Hours</b>				
Useful phrases, checking Plagiarism, how to ensure paper is as good as it could possibly be the first- time submission						
				<b>Total:</b>	<b>30 Hours</b>	
<b>Further Reading:</b>	-					
<b>Course Outcomes:</b>						
CO1	Understand that how to improve your writing skills and level of readability					
CO2	Learn about what to write in each section					
CO3	Understand the skills needed when writing a Title					
CO4	Understand the skills needed when writing the Conclusion					
CO5	Ensure the good quality of paper at very first-time submission					
<b>References:</b>						
1. R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies ““New Royal book Company.						
2. Sahni, Pardeep Et. Al. (Eds.),” Disaster Mitigation Experiences And Reflections”, Prentice Hall Of India, New Delhi.						
3. Goel S. L. , Disaster Administration And Management Text And Case Studies” ,Deep &Deep Publication Pvt. Ltd., New Delhi.						

2101AU002	DISASTER MANAGEMENT	L	T	P	C
		2	0	0	0
<b>COURSE OBJECTIVES:</b>					
	1. Summarize basics of disaster				
	2. Explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.				
	3. Illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.				
	4. Describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.				
	5. Develop the strengths and weaknesses of disaster management approaches				
<b>MODULE I</b>	<b>INTRODUCTION</b>	<b>6 Hours</b>			
Disaster: Definition, Factors and Significance; Difference between Hazard And Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude					
<b>MODULE II</b>	<b>REPERCUSSIONS OF DISASTERS AND HAZARDS</b>	<b>6 Hours</b>			
Economic Damage, Loss of Human and Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.					
<b>MODULE III</b>	<b>DISASTER PRONE AREAS IN INDIA</b>	<b>6 Hours</b>			
Study of Seismic Zones; Areas Prone To Floods and Droughts, Landslides And Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference To Tsunami; Post-Disaster Diseases and Epidemics					
<b>MODULE IV</b>	<b>DISASTER PREPAREDNESS AND MANAGEMENT</b>	<b>6 Hours</b>			
Preparedness: Monitoring Of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological And Other Agencies, Media Reports: Governmental and CommMODULEy Preparedness.					
<b>MODULE V</b>	<b>RISK ASSESSMENT</b>	<b>6 Hours</b>			
Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival					
				<b>Total:</b>	<b>30 Hours</b>
<b>FURTHER READING:</b>					
<b>COURSE OUTCOMES:</b>					
CO1	Ability to summarize basics of disaster				
CO2	Ability to explain a critical understanding of key concepts in disaster risk reduction and humanitarian response.				
CO3	Ability to illustrate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.				
CO4	Ability to describe an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.				
CO5	Ability to develop the strengths and weaknesses of disaster management approaches				
<b>References:</b>					
1. Goel S. L., Disaster Administration And Management Text And Case Studies”, Deep & Deep Publication Pvt. Ltd., New Delhi, 2009.					
2. Nishitha Rai, Singh AK, “Disaster Management in India: Perspectives, issues and strategies “NewRoyal book Company, 2007.					
3. Sahni, Pardeep Et. Al. ,” Disaster Mitigation Experiences And Reflections”, Prentice Hall Of India, New Delhi, 2001.					

2101AU003	SANSKRIT FOR TECHNICAL KNOWLEDGE	L	T	P	C
		2	0	0	0
<b>COURSE OBJECTIVES:</b>					
	1. Illustrate the basic sanskrit language				
	2. Recognize sanskrit, the scientific language in the world.				
	3. Appraise learning of sanskrit to improve brain functioning.				
	4. Relate sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power.				
	5. Extract huge knowledge from ancient literature.				
<b>MODULE I</b>	<b>ALPHABETS</b>	<b>6 Hours</b>			
	Alphabets in Sanskrit				
<b>MODULE II</b>	<b>TENSES AND SENTENCES</b>	<b>6 Hours</b>			
	Past/Present/Future Tense - Simple Sentences				
<b>MODULE III</b>	<b>ORDER AND ROOTS</b>	<b>6 Hours</b>			
	Order - Introduction of roots				
<b>MODULE IV</b>	<b>SANSKRIT LITERATURE</b>	<b>6 Hours</b>			
	Technical information about Sanskrit Literature				
<b>MODULE V</b>	<b>TECHNICAL CONCEPTS OF ENGINEERING</b>	<b>6 Hours</b>			
	Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics				
		<b>Total:</b>	<b>30 Hours</b>		
<b>FURTHER READING:</b>					
<b>COURSE OUTCOMES:</b>					
CO1	Understanding basic Sanskrit language				
CO2	Write sentences				
CO3	Know the order and roots of Sanskrit.				
CO4	Know about technical information about Sanskrit literature				
CO5	Understand the technical concepts of Engineering				
<b>REFERENCES:</b>					
	1. "Abhyastakam" – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi				
	1. "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication				
	2. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi, 2017.				

2101AU004	VALUE EDUCATION	L	T	P	C
		2	0	0	0
<b>COURSE OBJECTIVES:</b>					
	1. Understand value of education and self-development				
	2. Imbibe good values in students				
	3. Let the should know about the importance of character				
<b>MODULE I</b>		<b>6 Hours</b>			
Values and self-development–Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non-moral valuation. Standards and principles. Value judgements					
<b>MODULE II</b>		<b>8 Hours</b>			
Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, Nationaly Patriotism. Love for nature, Discipline					
<b>MODULE III</b>		<b>8 Hours</b>			
Personality and Behavior Development–Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labour. Universal brother hood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature					
<b>MODULE IV</b>		<b>8 Hours</b>			
Character and Competence–Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence, Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively.					
				<b>Total:</b>	<b>30 Hours</b>
<b>FURTHER READING:</b>					
<b>COURSE OUTCOMES:</b>					
CO1	Knowledge of self-development				
CO2	Learn the importance of Human values				
CO3	Developing the overall personality.				
<b>REFERENCES:</b>					
1. Chakroborty, S.K.“Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi					

2101AU005	CONSTITUTION OF INDIA			L	P	C
				2	0	0
<b>COURSE OBJECTIVES:</b>						
	1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective					
	2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional					
	3. Role and entitlement to civil and economic rights as well as the emergence nation hood in the early years of Indian nationalism.					
	4. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.					
<b>MODULE I</b>	<b>HISTORY OF MAKING OF THE INDIAN CONSTITUTION:</b>				<b>5 Hours</b>	
History, Drafting Committee, (Composition & Working)						
<b>MODULE II</b>	<b>PHILOSOPHY OF THE INDIAN CONSTITUTION:</b>				<b>5 Hours</b>	
Preamble, Salient Features						
<b>MODULE III</b>	<b>CONTOURS OF CONSTITUTIONAL RIGHTS AND DUTIES:</b>				<b>5 Hours</b>	
Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.						
<b>MODULE IV</b>	<b>ORGANS OF GOVERNANCE:</b>				<b>5 Hours</b>	
Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.						
<b>MODULE V</b>	<b>LOCAL ADMINISTRATION:</b>				<b>5 Hours</b>	
District's Administration head: Role and Importance Municipalities: Introduction, Mayor and role of Elected Representative, CEO, Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.						
<b>MODULE VI</b>	<b>ELECTION COMMISSION:</b>				<b>5 Hours</b>	
Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners - Institute and Bodies for the welfare of SC/ST/OBC and women.						
				<b>Total:</b>	<b>30 Hours</b>	
<b>FURTHER READING:</b>						
<b>COURSE OUTCOMES:</b>						
CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.					
CO2	Discuss the intellectual origins of informed the framework of argument that the conceptualization					
CO3	of social reforms leading to revolution in India.					
CO4	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.					
CO5	Discuss the passage of the Hindu Code Bill of 1956.					
<b>REFERENCES:</b>						
1. The Constitution of India, 1950 (Bare Act), Government Publication.						
2. Dr.S.N.Busi, Dr.B. R.Ambedkar framing of Indian Constitution, 1 <sup>st</sup> Edition, 2015.						
3. M.P. Jain, Indian Constitution Law, 7 <sup>th</sup> Edn., Lexis Nexis, 2014.						
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.						

2101AU006	PEDAGOGY STUDIES	L	P	C
		2	0	0
<b>COURSE OBJECTIVES:</b>				
	1. Review existing evidence on their view topic to inform programmed design and policy			
	2. Making under taken by the DfID, other agencies and researchers.			
	3. Identify critical evidence gaps to guide the development.			
<b>MODULE I</b>	<b>INTRODUCTION AND METHODOLOGY:</b>	<b>6 Hours</b>		
Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning, Curriculum, Teacher education - Conceptual framework, Research questions - Overview of methodology and Searching.				
<b>MODULE II</b>	<b>THEMATIC OVERVIEW</b>	<b>6 Hours</b>		
Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries - Curriculum, Teacher education.				
<b>MODULE III</b>	<b>EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES</b>	<b>6 Hours</b>		
Methodology for the in depth stage: quality assessment of included studies - How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? - Theory of change - Strength and nature of the body of evidence for effective pedagogical practices - Pedagogic theory and pedagogical approaches - Teachers' attitudes and beliefs and Pedagogic strategies.				
<b>MODULE IV</b>	<b>PROFESSIONAL DEVELOPMENT</b>	<b>6 Hours</b>		
Professional development: alignment with classroom practices and follow up support - Peer support - Support from the head teacher and the comm				
<b>MODULE V</b>	<b>RESEARCH GAPS AND FUTURE DIRECTIONS</b>	<b>6 Hours</b>		
Research design – Contexts – Pedagogy - Teacher education - Curriculum and assessment - Dissemination and research impact.				
		<b>Total:</b>	<b>30 Hours</b>	
<b>FURTHER READING:</b>				
<b>COURSE OUTCOMES:</b>				
CO1	What pedagogical practices are being used by teachers informal and informal classrooms in developing countries?			
CO2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?			
CO3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?			
<b>REFERENCES:</b>				
1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31(2): 245- 261.				
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36(3):361-379.				
3. Akyeampong K (2003) Teacher training in Ghana-does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.				
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33(3): 272–282.				
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.				
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.				
7. www.pratham.org/images/resource%20working%20paper%202.pdf				

2101AU007	<b>STRESS MANAGEMENT BY YOGA</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>COURSE OBJECTIVES:</b>					
		1. To achieve overall health of body and mind			
		2. To overcome stress			
<b>MODULE I</b>					<b>10 Hours</b>
Eight parts of yoga.(Ashtanga)					
<b>MODULE II</b>					<b>10 Hours</b>
Yam and Niyam - Do`s and Don`ts in life - i) Ahinsa, satya, astheya, bramhacharya and aparigraha,					
<b>MODULE III</b>					<b>10 Hours</b>
Asan and Pranayam - Various yog poses and their benefits for mind & body - Regularization of breathing techniques and its effects-Types of pranayam					
				<b>Total:</b>	<b>30 Hours</b>
<b>FURTHER READING:</b>					
<b>COURSE OUTCOMES:</b>					
CO1	Develop healthy mind in a healthy body thus improving social health also				
CO2	Improve efficiency				
<b>REFERENCES:</b>					
1. Yogic Asanas for Group Training-Part-I”:Janardan Swami Yoga bhyasi Mandal, Nagpur					
2. Rajayoga or conquering the Internal Nature” by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata					

2101AU008	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS	L	T	P	C
		2	0	0	0
<b>COURSE OBJECTIVES:</b>					
	1. To learn to achieve the highest goal happily				
	2. To become a person with stable mind, pleasing personality and determination				
	3. To awaken wisdom in students				
<b>MODULE I</b>		<b>10 Hours</b>			
Neetisatakam-holistic development of personality - Verses- 19,20,21,22 (wisdom) - Verses- 29,31,32 (pride & heroism) – Verses- 26,28,63,65 (virtue) - Verses- 52,53,59 (dont's) - Verses- 71,73,75,78 (do's)					
<b>MODULE II</b>		<b>10 Hours</b>			
Approach to day to day work and duties - Shrimad Bhagwad Geeta: Chapter 2-Verses 41, 47,48 - Chapter 3- Verses 13, 21, 27, 35 Chapter 6-Verses 5,13,17,23, 35 - Chapter 18-Verses 45, 46, 48.					
<b>MODULE III</b>		<b>10 Hours</b>			
Statements of basic knowledge - Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 Chapter 12 -Verses 13, 14, 15, 16,17, 18 - Personality of role model - shrimad bhagwad geeta - Chapter2-Verses 17, Chapter 3-Verses 36,37,42 - Chapter 4-Verses 18, 38,39 Chapter18 – Verses37,38,63					
				<b>Total:</b>	<b>30 Hours</b>
<b>FURTHER READING:</b>					
<b>COURSE OUTCOMES:</b>					
CO1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life				
CO2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity				
CO3	Study of Neet is hatakam will help in developing versatile personality of students.				
<b>REFERENCES:</b>					
1. Gopinath, Rashtriya Sanskrit Sansthanam P, Bhartrihari's Three Satakam, Niti- sringar- vairagya, New Delhi,2010					
2. Swami Swarupananda , Srimad Bhagavad Gita, Advaita Ashram, Publication Department,Kolkata, 2016.					



2101AU009	UNNAT BHARAT ABHIYAN	L	T	P	C	
		2	0	0	0	
<b>COURSE OBJECTIVES:</b>						
	1. Unnat Bharat Abhiyan is inspired by the vision of transformational change in rural development processes by leveraging knowledge institutions to help build the architecture of an Inclusive India.					
	2. The Mission of Unnat Bharat Abhiyan is to enable higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth.					
	3. It also aims to create a virtuous cycle between society and an inclusive academic system by providing knowledge and practices for emerging professions and to upgrade the capabilities of both the public and the private sectors in responding to the development needs of rural India					
<b>MODULE 1</b>		<b>10 Hours</b>				
Introduction. Holistic development of a village – Economic, Social, Human, Governance, Basic Amenities, Environmental aspects. Vision and mission of UBA. Activities of Unnat Bharat Abhiyan. Expediting the process of indigenous, sustainable rural development with effective support from professional institutes of higher education. Building capacity in institutes of Higher Education for research, training and development of technologies relevant to national needs, especially those of rural India. Creating the Requisite Structure to Cope with the Challenge.						
<b>MODULE 2</b>		<b>10 Hours</b>				
National Steering Committee for UBA (NSC - UBA). The Coordinating Institution for UBA (CI-UBA) and its Responsibilities. Identification and Role of Mentoring Institutions (MI - UBA). Identification and Role of Subject Expert Groups (SEG - UBA). UBA Participating Institutions in General (PIs - UBA).						
<b>MODULE 3</b>		<b>10 Hours</b>				
Methodology of Intervention and Monitoring. Expected outcomes from UBA. Mechanism for Providing the Base-level funding from MHRD. Various Sources of Funding for the Actual Cluster Development Work. Status of Steps Already Completed towards Setting up the Structural Network of UBA. Major activities so far. Action Plans.						
				<b>Total:</b>	<b>30 Hours</b>	
<b>REFERENCES:</b>						
1. <a href="https://www.rcisgbau.in/pdf/UBA_concept_note.pdf">https://www.rcisgbau.in/pdf/UBA_concept_note.pdf</a>						
2. <a href="https://unnatbharatabhiyan.gov.in/documents">https://unnatbharatabhiyan.gov.in/documents</a>						
3. <a href="https://unnatbharatabhiyan.gov.in:8443/introduction">https://unnatbharatabhiyan.gov.in:8443/introduction</a>						
4. <a href="https://unnatbharatabhiyan.gov.in:8443/new-website/https://unnatbharatabhiyan.gov.in:8443/app/webroot/files/general-documents/Unnat%20Bharat%20Abhiyan-%20Brochure%202016.pdf">https://unnatbharatabhiyan.gov.in:8443/new-website/https://unnatbharatabhiyan.gov.in:8443/app/webroot/files/general-documents/Unnat%20Bharat%20Abhiyan-%20Brochure%202016.pdf</a>						